FCC Test Report

(PART 90)

Report No.:	RF200902C02-8
FCC ID:	V65E4830
Test Model:	E4830
Series Model:	E4830NC
Received Date:	Sep. 09, 2020
Test Date:	Sep. 12 ~ Sep. 25, 2020
Issued Date:	Oct. 27, 2020
Applicant:	Kyocera Corporation ℅ Kyocera International, Inc.
Address:	8611 Balboa Avenue, San Diego, CA 92123
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	427177 / TW0011

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF200902C02-8	Original Release	Oct. 27, 2020

1 Certificate of Conformity

Product:	Feature Phone
Brand:	Kyocera
Test Model:	E4830
Series Model:	E4830NC
Sample Status:	Identical Prototype
Applicant:	Kyocera Corporation ℅ Kyocera International, Inc.
Test Date:	Sep. 12 ~ Sep. 25, 2020
Standards:	FCC Part 90, Subpart I, R FCC Part 2

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Gina Liu , **Date:** Oct. 27, 2020

Gina Liu / Specialist

Approved by : , **Date:** Oct. 27, 2020

Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 90 & Part 2 (LTE 14)			
FCC Clause	**Test Item**	**Result**	**Remarks**
2.1046 90.542 (a)(7)	Effective Radiated Power	Pass	Meet the requirement of limit.
2.1047	Modulation Characteristics	Pass	Meet the requirement.
2.1055 90.539 (e)	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
90.210 (n)	Emission Masks	Pass	Meet the requirement of limit.
90.543 (e)(2)(3)	Band Edge Measurements	Pass	Meet the requirement of limit.
2.1051 90.543 (c) (f)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 90.543 (c) (f)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -16.03 dB at 1586.00 MHz.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.0400 dB
	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Aug. 24, 2020	Aug. 23, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 24, 2019	Nov. 23, 2020
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 12, 2019	Nov. 11, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 24, 2019	Nov. 23, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2019	Nov. 24, 2020
Preamplifier Agilent	310N	187226	Jun. 17, 2020	Jun. 16, 2021
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2020	Jun. 16, 2021
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 17, 2020	Jun. 16, 2021
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 17, 2020	Jun. 17, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jul. 01, 2019	Jun. 30, 2021
Radio Communication Analyzer Anritsu	MT8820C	6201300640	Aug. 19, 2019	Aug. 18, 2021
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 09, 2020	Sep. 08, 2021
DC Power Supply Topward	33010D	807748	NA	NA

Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.

3 General Information

3.1 General Description of EUT

Product	Feature Phone	
Brand	Kyocera	
Test Model	E4830	
Series Model	E4830NC	
Status of EUT	Identical Prototype	
Power Supply Rating	3.8 Vdc (Battery) 5.0 Vdc (adapter or host equipment)	
Modulation Type	LTE	QPSK, 16QAM
Frequency Range	LTE Band 14 (Channel Bandwidth: 5 MHz)	790.5 ~ 795.5 MHz
	LTE Band 14 (Channel Bandwidth: 10 MHz)	793 MHz
Emission Designator	LTE Band 14 (Channel Bandwidth: 5 MHz)	4M49D7W
	LTE Band 14 (Channel Bandwidth: 10 MHz)	8M96D7W
Max. ERP Power	LTE Band 14 (Channel Bandwidth: 5 MHz)	186.25 mW
	LTE Band 14 (Channel Bandwidth: 10 MHz)	187.80 mW
Antenna Type	Monopole Antenna with -1.42 dBi gain	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

1. All models are listed as below. (Test Model: E4830)

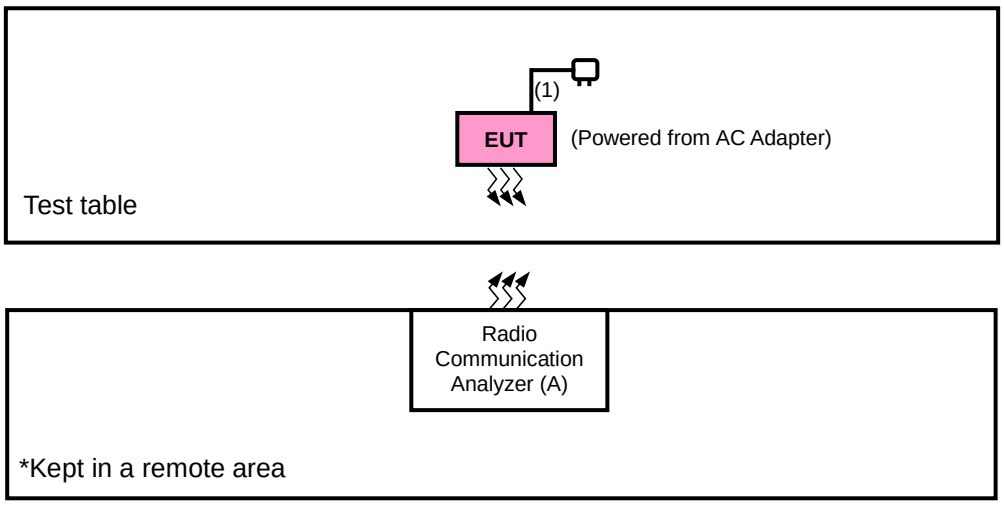
Brand	Model	Difference
Kyocera	E4830	with Camera
	E4830NC	without Camera

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	Kyocera	SCP-47ADT	I/P: 100-240 Vac, 50/60 Hz, 200 mA O/P: 5 Vdc, 1000 mA
Battery	Kyocera	SCP-73LBPS	3.8 Vdc, Min/Typ 1720/1770 mAh
USB Cable	KYOCERA	SCP-26SDC	1.0 meter, Shielded, w/o core

3. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Radio Communication Analyzer	Anritsu	MT8820C	6201300640	N/A	--

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as communication partner to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	1.0	Y	0	Accessory of the EUT

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Band	ERP	Radiated Emission
LTE Band 14	X-plane	X-axis

LTE Band 14

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	ERP	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
		23330	23330	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset
-	Modulation Characteristics	23330	23330	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Frequency Stability	23305 to 23355	23305, 23355	5 MHz	QPSK	25 RB / 0 RB Offset
		23330	23330	10 MHz	QPSK	50 RB / 0 RB Offset
-	Occupied Bandwidth	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23330	23330	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Emission Mask	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		23330	23330	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
-	Band Edge	23305 to 23355	23305, 23355	5 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 24 RB Offset
						25 RB / 0 RB Offset
		23330	23330	10 MHz	QPSK, 16QAM	1 RB / 0 RB Offset 1 RB / 49 RB Offset
						50 RB / 0 RB Offset
-	Conducted Emission	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK	1 RB / 0 RB Offset
		23330	23330	10 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	23305 to 23355	23305, 23330, 23355	5 MHz	QPSK	1 RB / 0 RB Offset
		23330	23330	10 MHz	QPSK	1 RB / 0 RB Offset

Note:

1. This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation. Therefore, only ERP, modulation characteristics, occupied bandwidth, emission mask and band edge items had been tested under QPSK, 16QAM mode, the other items were performed under QPSK mode only.
2. For radiated emission above 1 GHz, according to 3GPP 36.521 Section 6.6.3.1.4, choose the lowest, 5 MHz & highest channel bandwidth for final test.
3. For radiated emissions below 1 GHz, select the worst radiated emission channel for final testing

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
ERP	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee
Modulation Characteristics	25 deg. C, 65 % RH	120 Vac, 60 Hz	Wayne Lin
Frequency Stability	25 deg. C, 65 % RH	3.8Vdc	Wayne Lin
Occupied Bandwidth	25 deg. C, 65 % RH	120 Vac, 60 Hz	Wayne Lin
Peak to Average Ratio	25 deg. C, 65 % RH	120 Vac, 60 Hz	Wayne Lin
Emission Mask	25 deg. C, 65 % RH	120 Vac, 60 Hz	Wayne Lin
Band Edge	25 deg. C, 65 % RH	120 Vac, 60 Hz	Wayne Lin
Conducted Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Wayne Lin
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

3.5 General Description of Applied Standards and references

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:
FCC 47 CFR Part 2
FCC 47 CFR Part 90
ANSI 63.26-2015

Note: All test items have been performed and recorded as per the above standards.

References Test Guidance:
KDB 971168 D01 Power Meas License Digital Systems v03r01
KDB 971168 D02 Misc Rev Approv License Devices v02r01
ANSI/TIA/EIA-603-E 2016
3GPP TS 36.521-1 V16.3.0 (2019-12)

Note: All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

4.1.2 Test Procedures

EIRP / ERP Measurement:

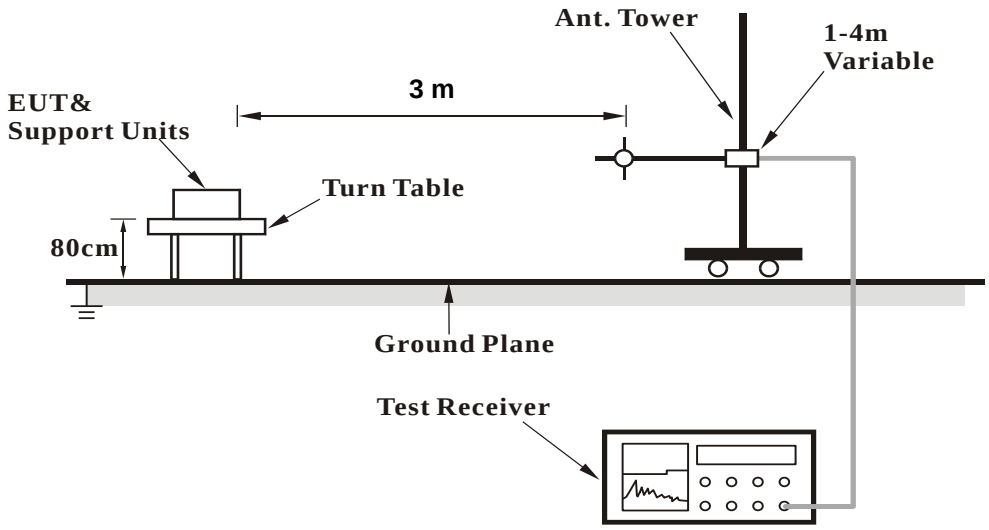
a. All measurements were done at low, middle and high operational frequency range. RBW 5 MHz、10MHz for LTE mode, VBW ≥ 3 x RBW.
b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dB.

Conducted Power Measurement:

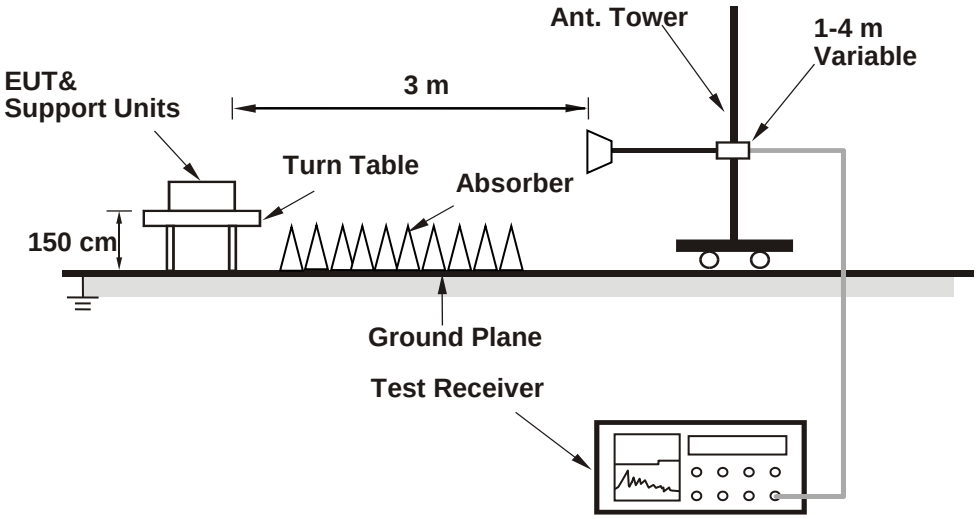
a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.3 Test Setup

EIRP / ERP Measurement:
<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Conducted Power Measurement:

4.1.4 Test Results

Conducted Output Power (dBm)

LTE Band 14																	
BW	MCS Index	RB Size	RB Offset		Mid		3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel			23330					Channel		23355	23330	23355	
		Frequency (MHz)			793					Frequency (MHz)		795.5	793	795.5	
10M	QPSK	1	0		**23.69**		0	5M	QPSK	1	0	23.53	23.57	23.61	0
		1	24		23.66		0			1	12	23.48	23.52	23.56	0
		1	49		23.51		0			1	24	23.54	23.58	23.62	0
		25	0		22.58		1			12	0	22.54	22.58	22.62	1
		25	12		22.54		1			12	6	22.46	22.50	22.54	1
		25	25		22.41		1			12	13	22.49	22.53	22.57	1
		50	0		22.69		1			25	0	22.43	22.47	22.51	1
	16QAM	1	0		22.65		1		16QAM	1	0	22.45	22.48	22.56	1
		1	24		22.43		1			1	12	22.46	22.43	22.48	1
		1	49		22.25		1			1	24	22.45	22.52	22.60	1
		25	0		21.65		2			12	0	21.52	21.55	21.55	2
		25	12		21.68		2			12	6	21.39	21.41	21.50	2
		25	25		21.49		2			12	13	21.49	21.49	21.48	2
		50	0		21.69		2			25	0	21.38	21.47	21.49	2

ERP Power (dBm)

LTE Band 14							
Channel Bandwidth: 5 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23305	790.5	-7.98	32.771	22.64	183.70	H
	23330	793.0	-7.89	32.741	22.70	186.25	
	23355	795.5	-8.25	32.854	22.45	175.95	
	23305	790.5	-13.85	32.5	16.50	44.67	V
	23330	793.0	-13.75	32.52	16.62	45.92	
	23355	795.5	-14.12	32.62	16.35	43.15	
Channel Bandwidth: 5 MHz / 16QAM							
X	23305	790.5	-8.99	32.771	21.63	145.58	H
	23330	793.0	-8.89	32.741	21.70	147.94	
	23355	795.5	-9.26	32.854	21.44	139.44	
	23305	790.5	-14.85	32.5	15.50	35.48	V
	23330	793.0	-14.75	32.52	15.62	36.48	
	23355	795.5	-15.12	32.62	15.35	34.28	

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

LTE Band 14							
Channel Bandwidth: 10 MHz / QPSK							
Plane	**Channel**	**Frequency (MHz)**	**Reading (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (mW)**	**Polarization (H/V)**
X	23330	793.0	-7.85	32.737	22.74	187.80	H
	23330	793.0	-13.72	32.52	16.65	46.24	V
Channel Bandwidth: 10 MHz / 16QAM							
X	23330	793.0	-8.85	32.737	21.74	149.18	H
	23330	793.0	-14.72	32.52	15.65	36.73	V

Note: ERP (dBm) = Reading (dBm) + Correction Factor (dB) – 2.15

4.2 Modulation Characteristics Measurement

4.2.1 Limits of Modulation Characteristics

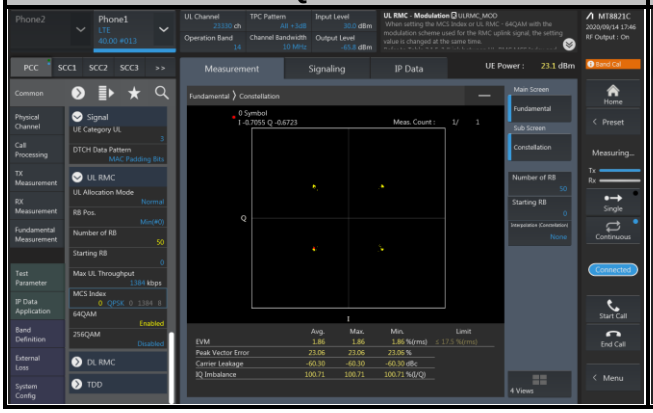
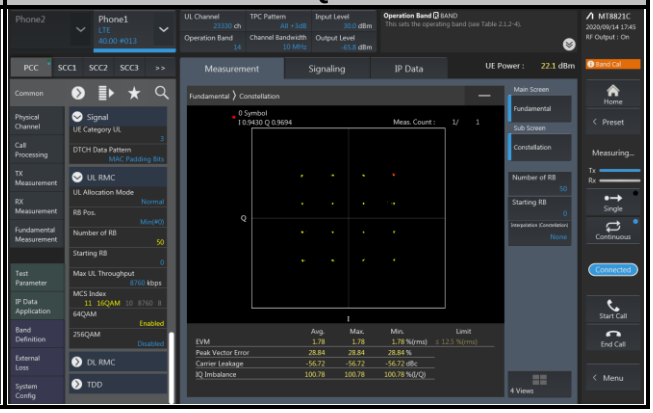
N/A

4.2.2 Test Setup

4.2.3 Test Procedure

Connect the EUT to Communication Simulator via the antenna connector. The frequency band is set as EUT supported Modulation and Channels, the EUT output is matched with 50 ohm load, the waveform quality and constellation of the EUT was tested.

4.2.4 Test Results

Spectrum Plot of Measurement	
LTE Band 14	
Channel 23330	
QPSK	16QAM
	

4.3 Frequency Stability Measurement

4.3.1 Limits of Frequency Stability Measurement

LTE Band 14

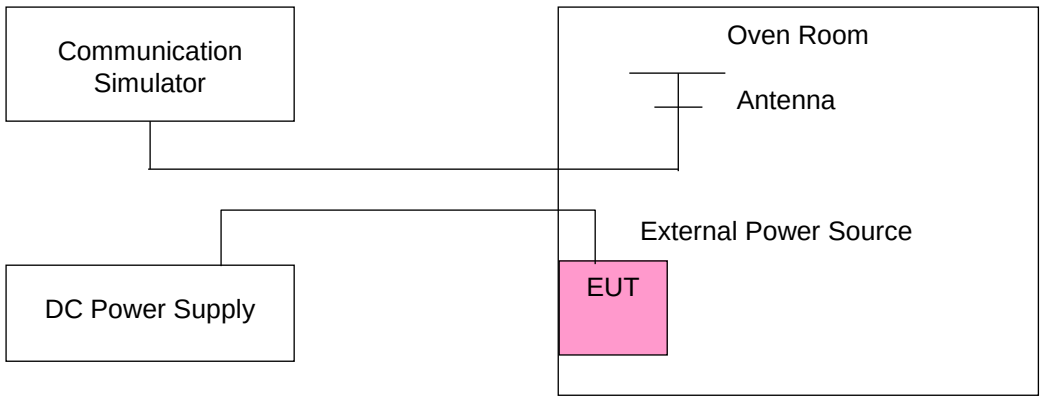
The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

4.3.2 Test Procedure

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.3.3 Test Setup



4.3.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 14			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
3.8	790.500003	0.004	795.500003	0.003
3.6	790.500001	0.001	795.500004	0.005
4.35	790.500003	0.003	795.500004	0.005

Note: The applicant defined the normal working voltage is from 3.6 Vdc to 4.35 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 14			
	Channel Bandwidth: 5 MHz			
	Low Channel		High Channel	
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)
-20	790.500004	0.005	795.500002	0.002
-10	790.500003	0.004	795.500002	0.002
0	790.500002	0.003	795.500002	0.003
10	790.500002	0.003	795.500002	0.003
20	790.499998	-0.002	795.499998	-0.003
30	790.499999	-0.001	795.499998	-0.003
40	790.499999	-0.002	795.499997	-0.004
50	790.499997	-0.004	795.499997	-0.004
60	790.499999	-0.002	795.499998	-0.002

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 14	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
3.8	793.000001	0.001
3.6	793.000001	0.002
4.35	793.000002	0.002

Note: The applicant defined the normal working voltage is from 3.6 Vdc to 4.35 Vdc.

Frequency Error vs. Temperature

Temp. (℃)	LTE Band 14	
	Channel Bandwidth: 10 MHz	
	Frequency (MHz)	Frequency Error (ppm)
-20	793.000004	0.005
-10	793.000002	0.002
0	793.000003	0.004
10	793.000001	0.001
20	792.999998	-0.003
30	792.999996	-0.005
40	792.999998	-0.003
50	792.999997	-0.004
60	792.999998	-0.002

4.4 Occupied Bandwidth Measurement

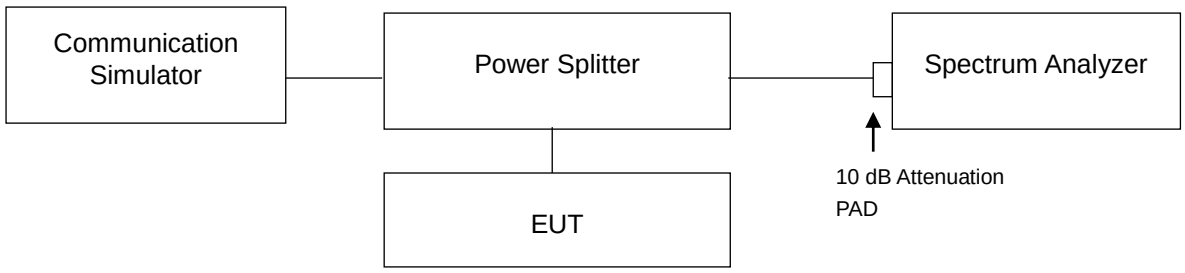
4.4.1 Limits of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

4.4.2 Test Procedure

The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.4.3 Test Setup



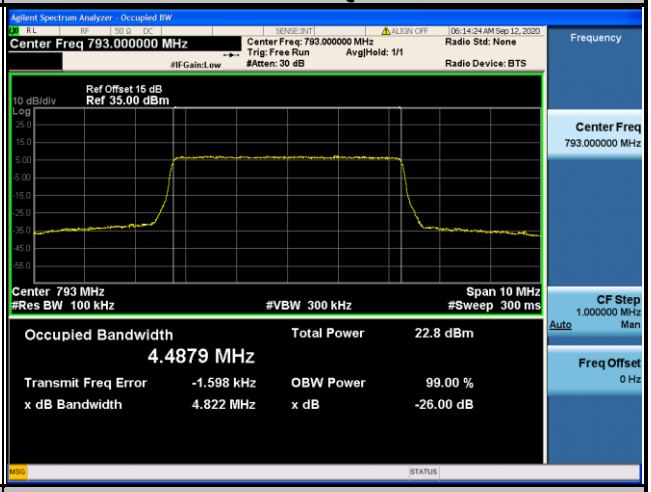
4.4.4 Test Results

LTE Band 14					
Channel Bandwidth: 5 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23305	790.5	4.4874	4.4876	4.793	4.813
23330	793.0	4.4868	4.4879	4.795	4.822
23355	795.5	4.4887	4.4888	4.815	4.814
Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		26 dB Bandwidth (MHz)	
		QPSK	16QAM	QPSK	16QAM
23330	793.0	8.9524	8.9617	9.510	9.513

Spectrum Plot of Worst Value

99 % Occupied Bandwidth — 5 MHz / 16QAM

26 dB Bandwidth — 5 MHz / QPSK



10 MHz / 16QAM

10 MHz / 16QAM

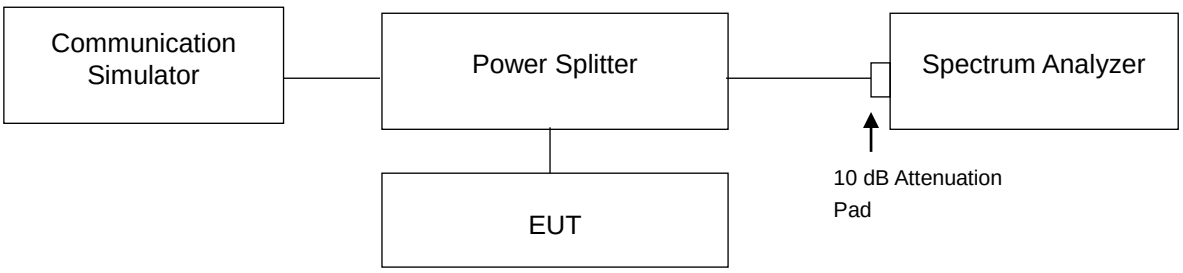
4.5 Emission Mask Measurement

4.5.1 Limits of Emission Mask Measurement

1. On any frequency removed from the assigned frequency by more than 50 percent, but not more than100 percent of the authorized bandwidth: At least 25 dB.
2. On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
3. On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

For §90.691(a), RBW=300 Hz for offset less than 37.5 kHz from channel edge and RBW=100 kHz for offsets greater than 37.5 kHz is allowed.

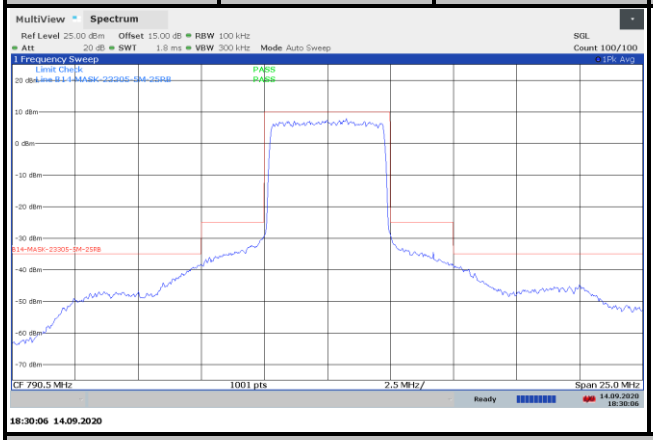
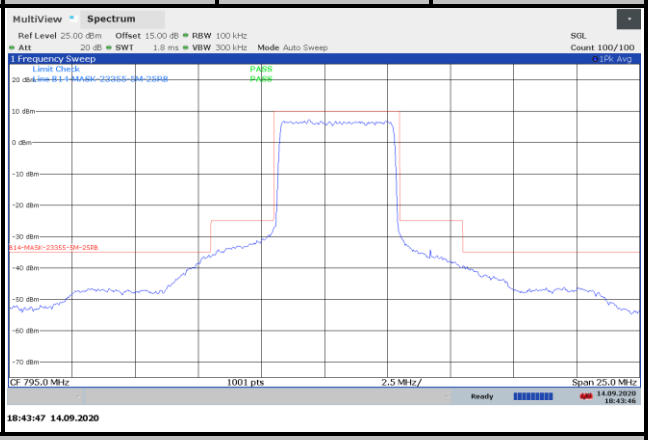
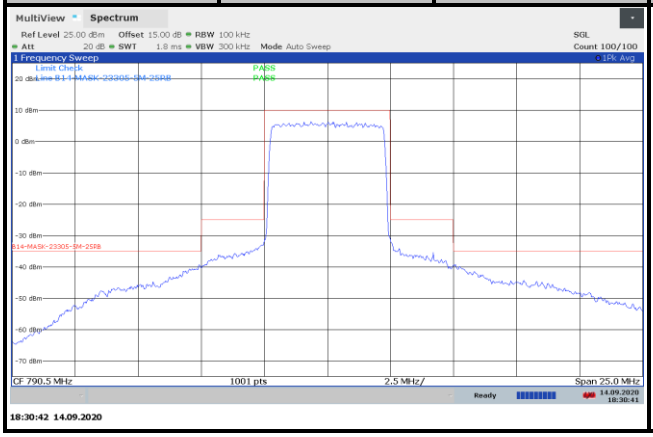
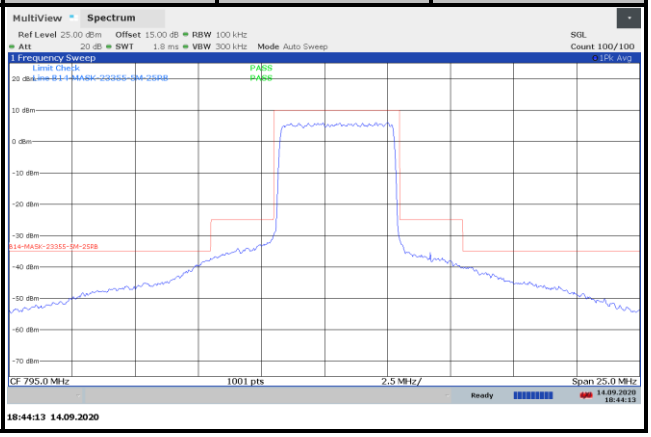
4.5.2 Test Setup

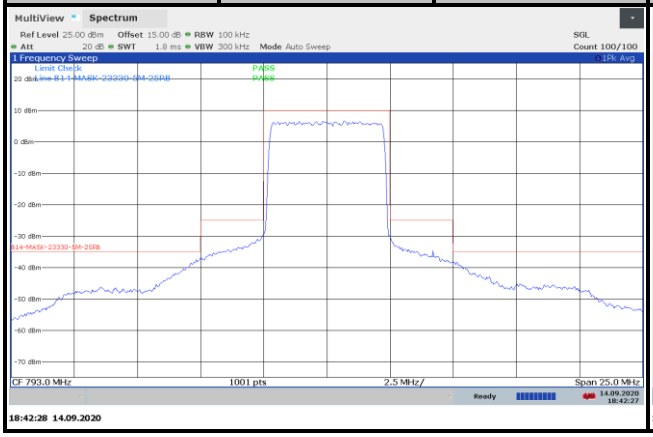
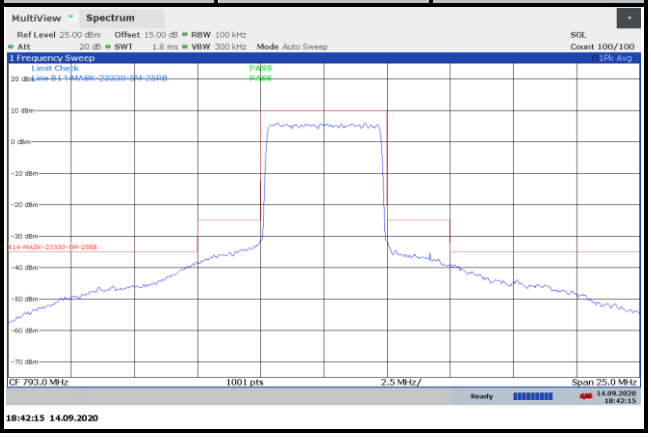


4.5.3 Test Procedures

a. The measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
b. Record the test plot.

4.5.4 Test Results

LTE Band 14					
Channel Bandwidth: 5 MHz / QPSK					
Channel	23305	25 RB	Channel	23355	25 RB
					
Channel Bandwidth: 5 MHz / 16QAM					
Channel	23305	25 RB	Channel	23355	25 RB
					

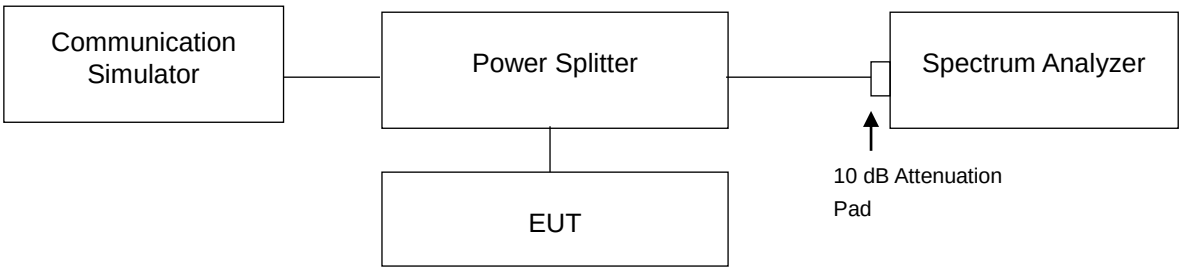
LTE Band 14					
Channel Bandwidth: 10 MHz / QPSK			Channel Bandwidth: 10 MHz / 16QAM		
Channel	23330	25 RB	Channel	23330	25 RB
					

4.6 Band Edge Measurement

4.6.1 Limits of Band Edge Measurement

(1) On all frequencies between 769 - 775 MHz and 799 - 805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.
(2) On all frequencies between 769 - 775 MHz and 799 - 805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.
(3) On any frequency between 775 - 788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P).

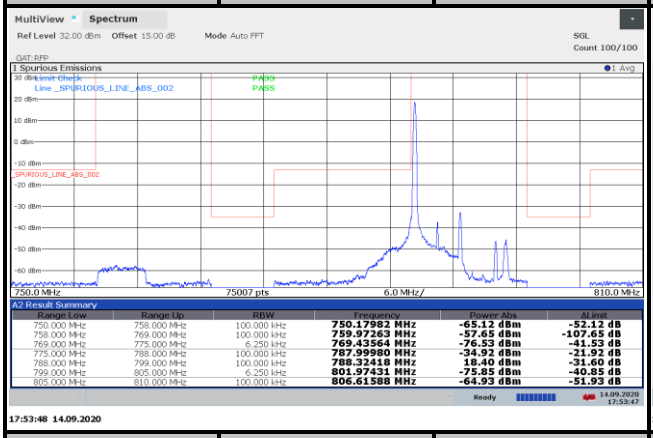
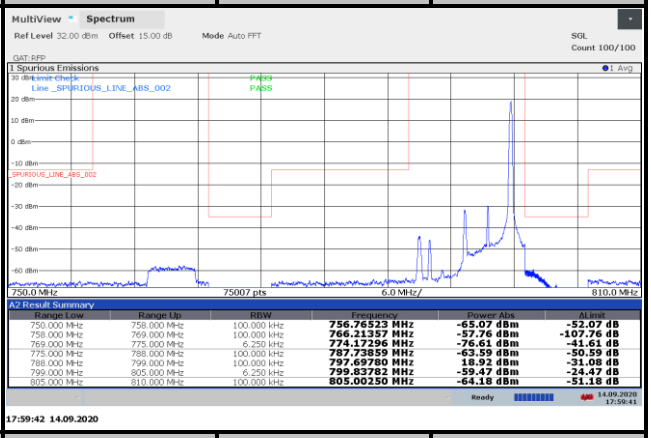
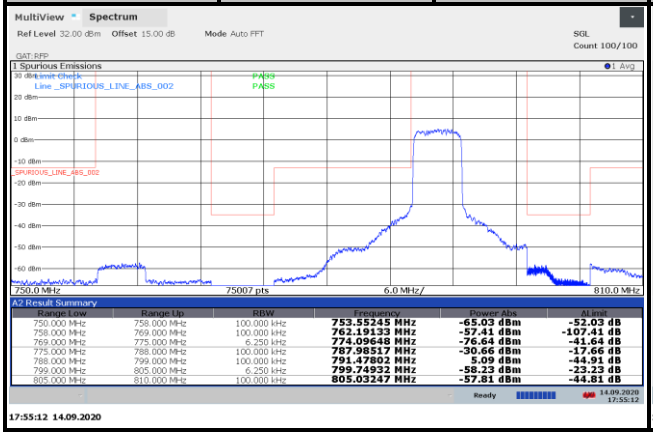
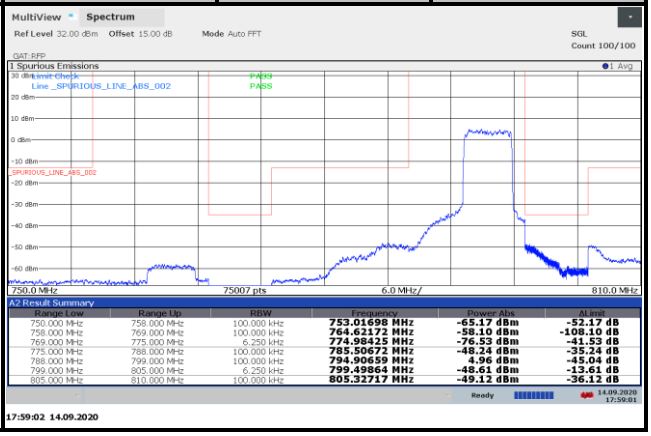
4.6.2 Test Setup

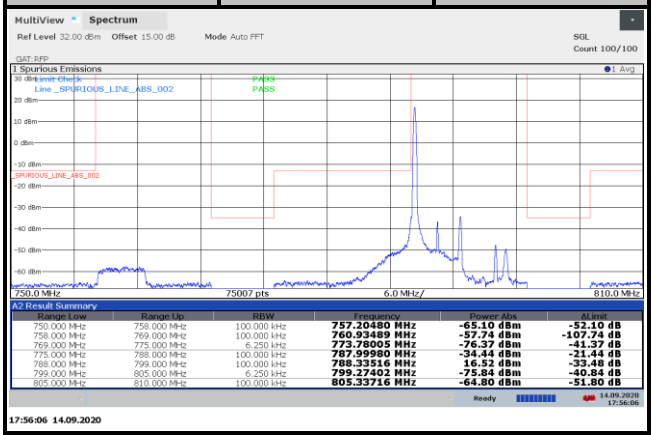
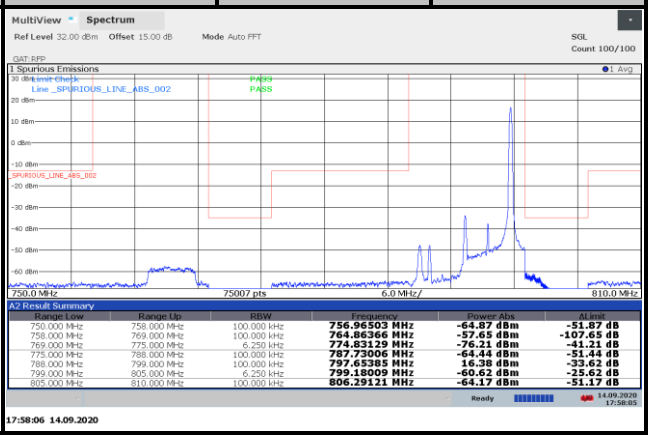
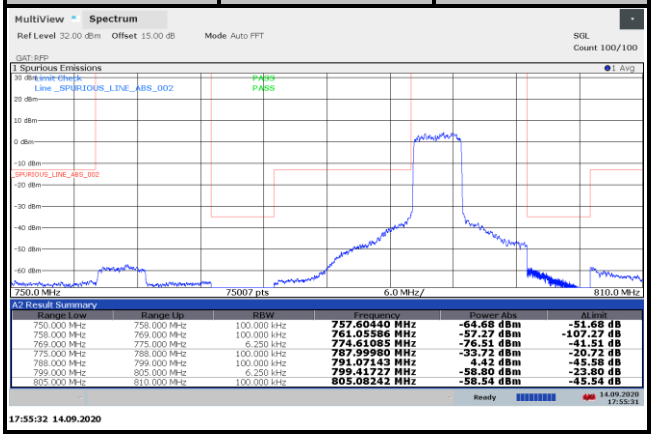
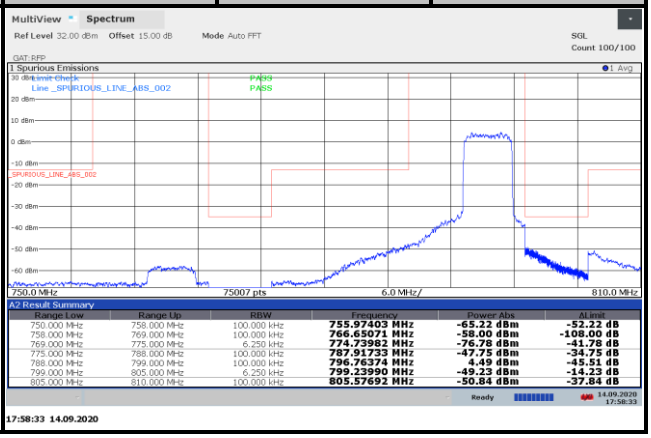


4.6.3 Test Procedures

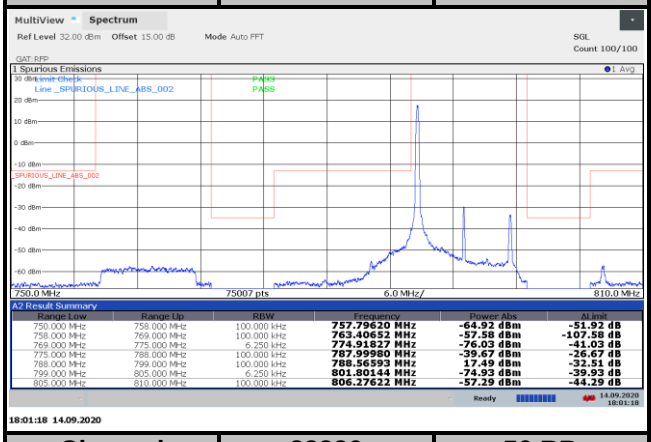
a. All measurements were done at low and high operational frequency range.
b. The band edge measurement used the power splitter via EUT RF power connector between signal generator and spectrum analyzer. This splitter loss, attenuator loss and cable loss are the worst loss 15 dB in the transmitted path track.
c. Record the max. trace plot into the test report.

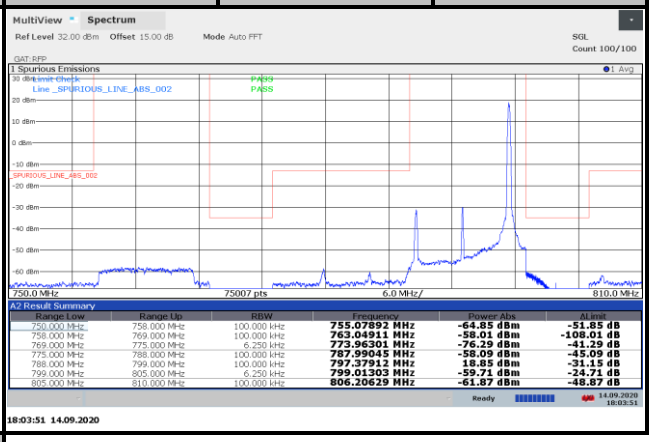
4.6.4 Test Results

LTE Band 14					
Channel Bandwidth: 5 MHz / QPSK					
Channel	23305	1 RB	Channel	23355	1 RB
					
Channel	23305	25 RB	Channel	23355	25 RB
					

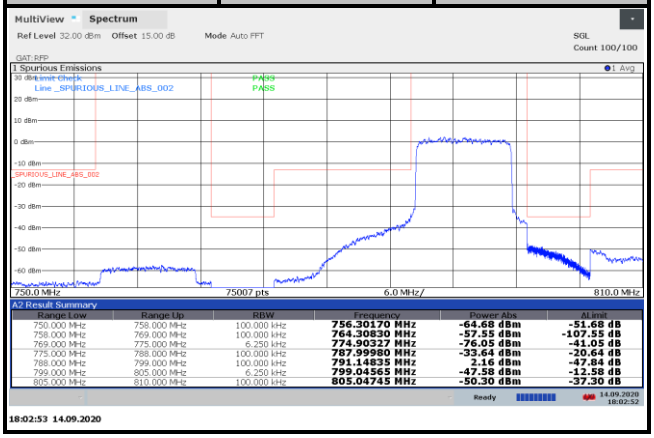
LTE Band 14					
Channel Bandwidth: 5 MHz / 16QAM					
Channel	23305	1 RB	Channel	23355	1 RB
					
Channel	23305	25 RB	Channel	23355	25 RB
					

LTE Band 14					
Channel Bandwidth: 10 MHz / QPSK					
Channel	23330	1 RB	Channel	23330	1 RB

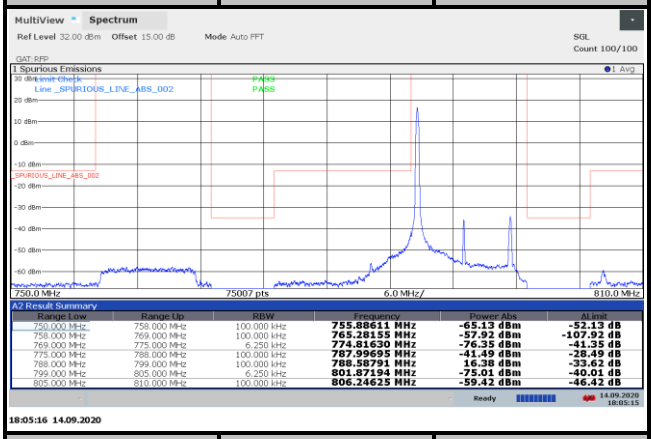




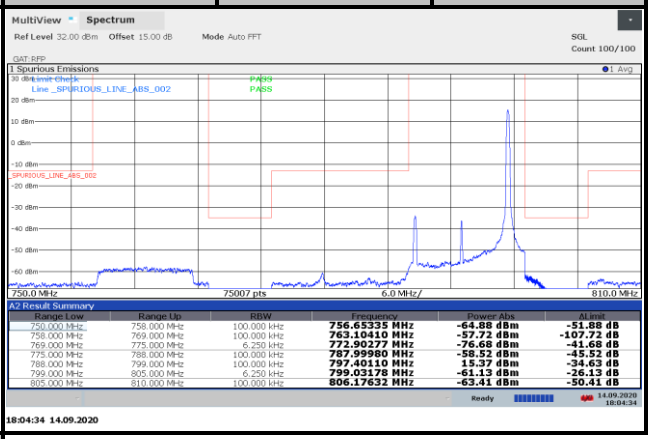
Channel	23330	50 RB



LTE Band 14					
Channel Bandwidth: 10 MHz / 16QAM					
Channel	23330	1 RB	Channel	23330	1 RB

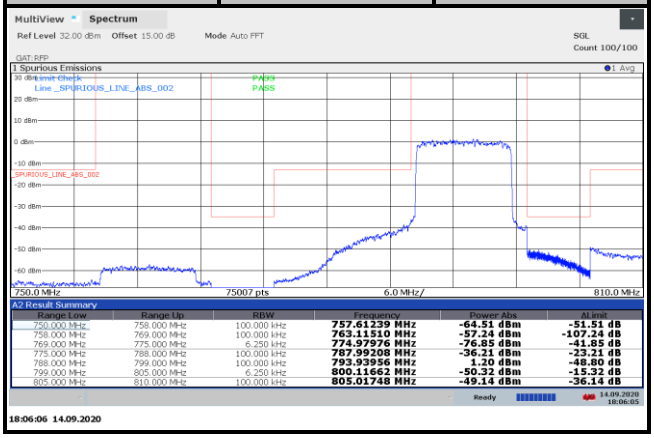


18:05:16 14.09.2020



18:04:34 14.09.2020

Channel	23330	50 RB



18:06:06 14.09.2020

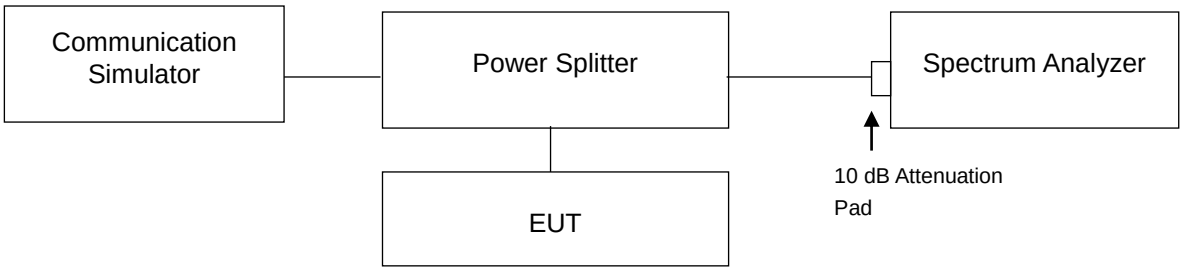
4.7 Conducted Spurious Emissions

4.7.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 $\log_{10}$(P) dB. The limit of emission is equal to -13 dBm.

On all frequencies between 769–775 MHz and 799–805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.
For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz. The limit of emission is equal to -40dBm.

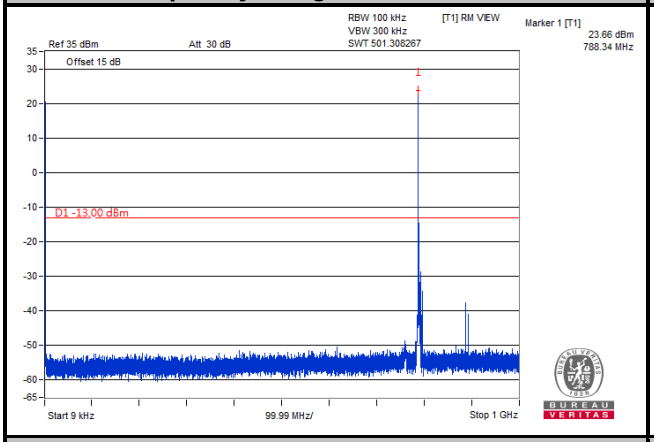
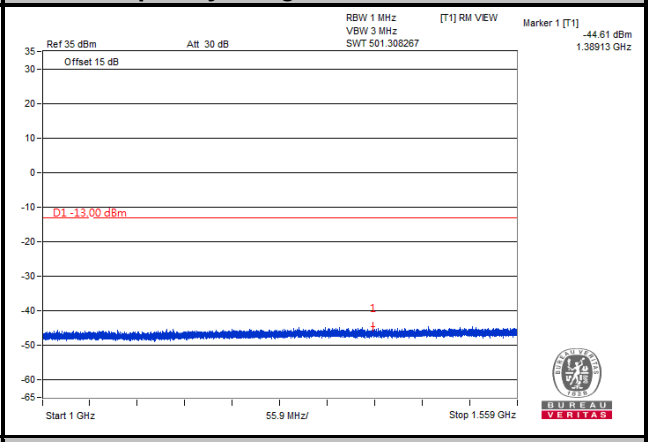
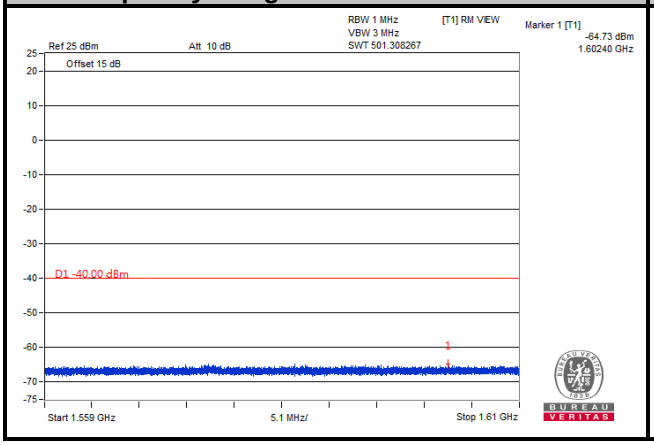
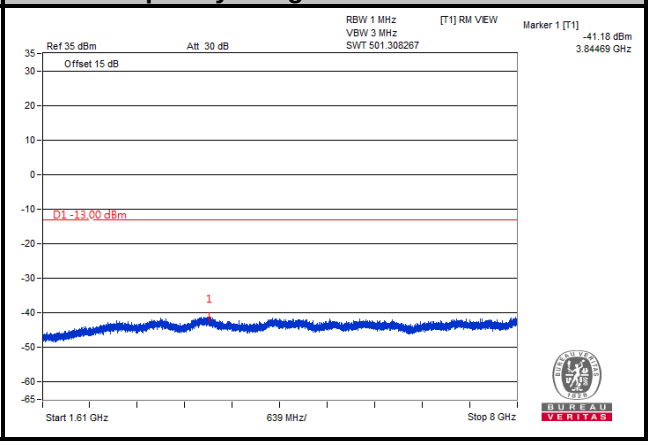
4.7.2 Test Setup



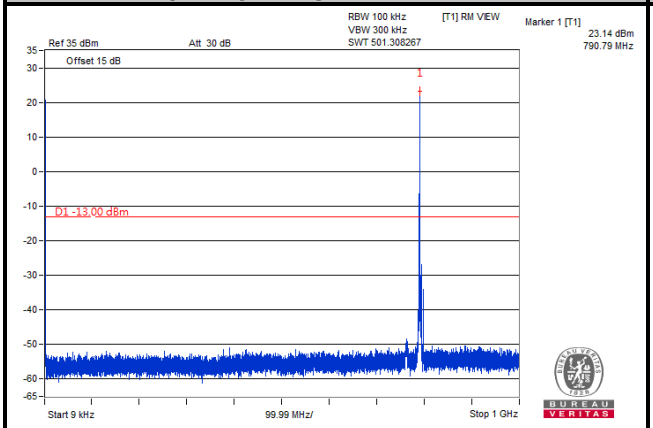
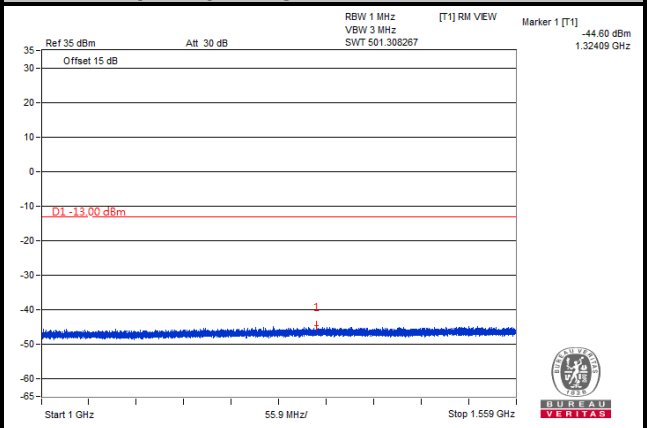
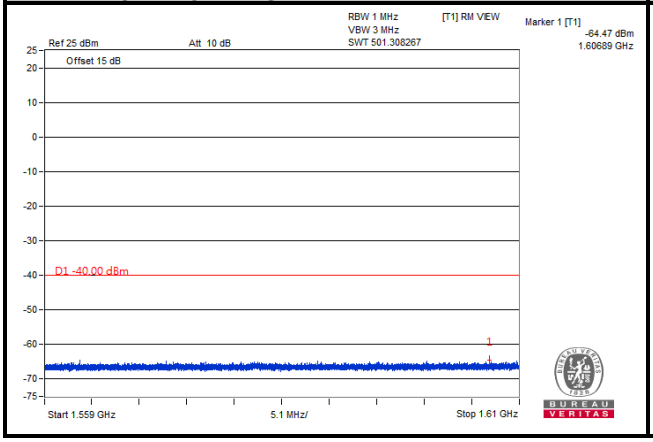
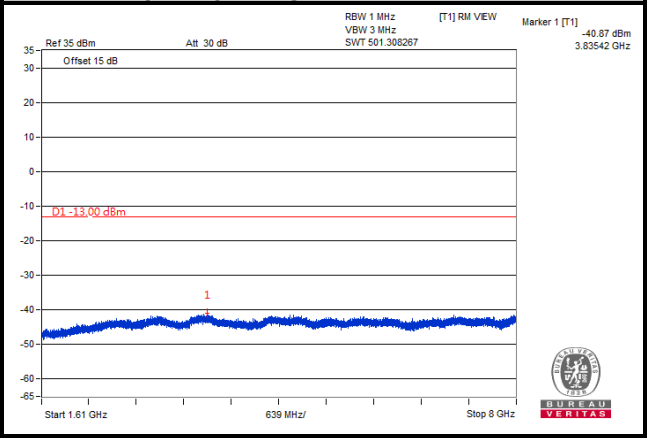
4.7.3 Test Procedure

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
b. Measuring frequency range is from 9 kHz to 1 GHz. 10 dB attenuation pad is connected with spectrum. RBW= 1 MHz and VBW= 3 MHz are used for conducted emission measurement.
c. Measuring frequency range is from 1 GHz to 8 GHz. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.

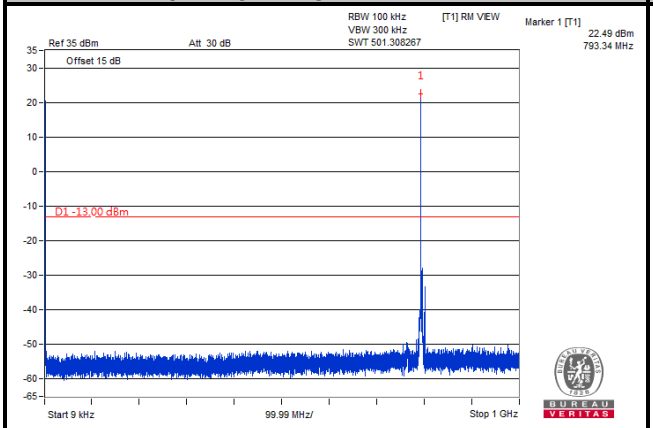
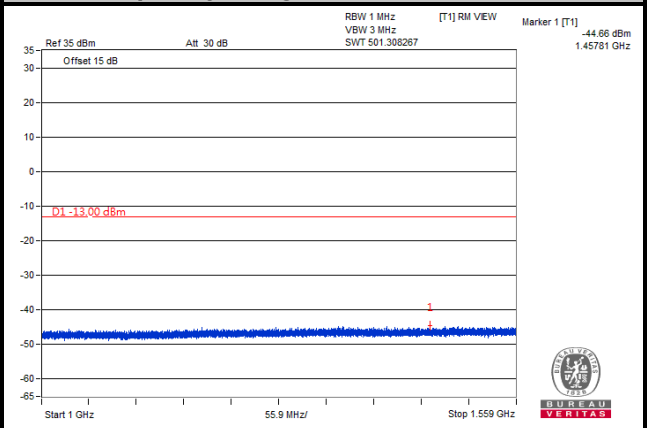
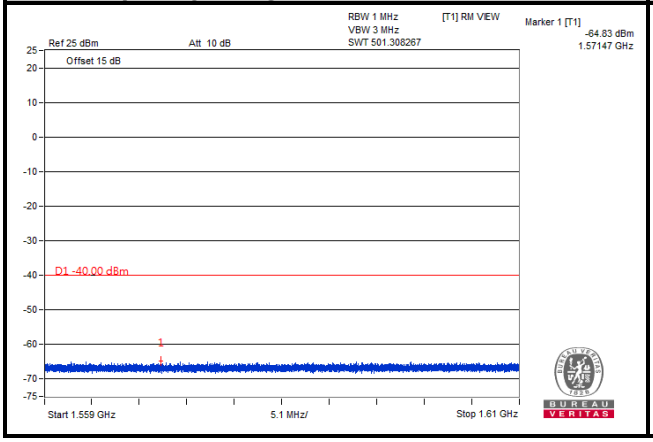
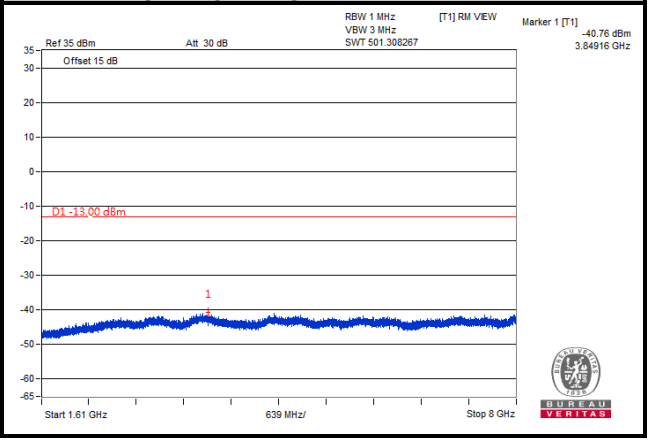
4.7.4 Test Results

LTE Band 14	
Channel Bandwidth: 5 MHz	
Channel 23305	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 1.559 GHz
	
Frequency Range: 1.559 GHz ~ 1.61 GHz	Frequency Range: 1.61 GHz ~ 8 GHz
	

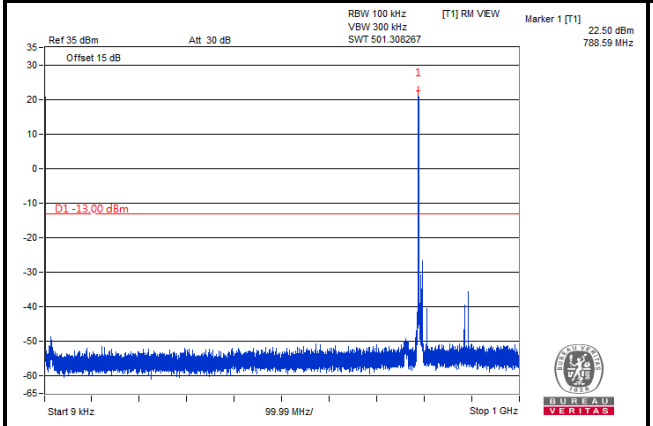
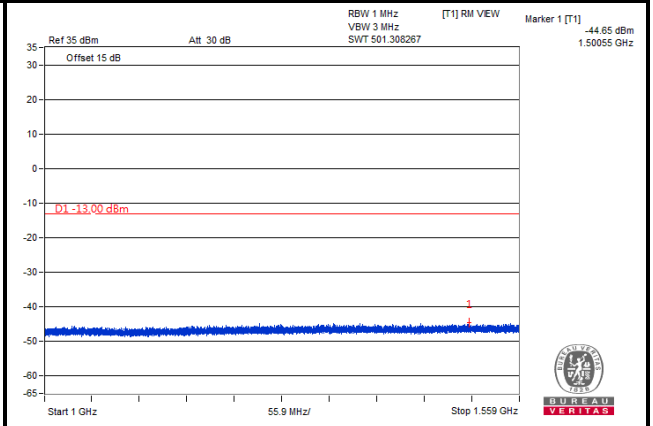
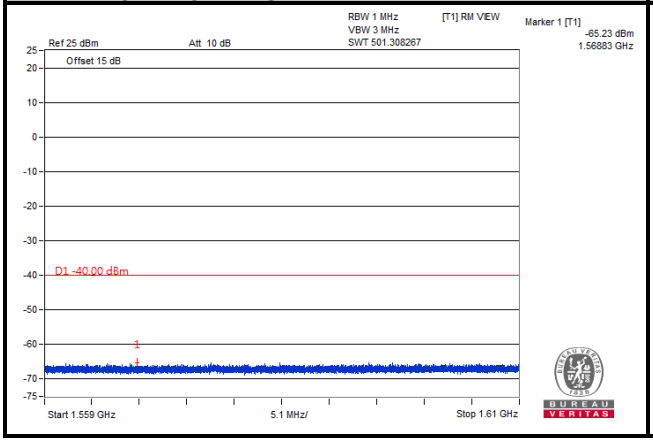
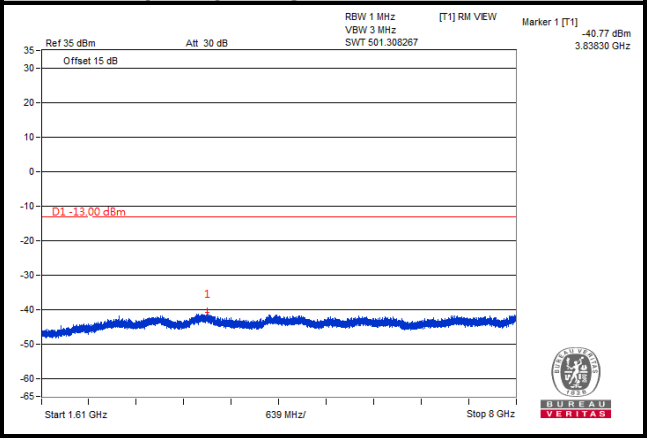
Note: The signal over the limit at 9 kHz is from the spectrum analyzer.

LTE Band 14	
Channel Bandwidth: 5 MHz	
Channel 23330	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 1.559 GHz
	
Frequency Range: 1.559 GHz ~ 1.61 GHz	Frequency Range: 1.61 GHz ~ 8 GHz
	

Note: The signal over the limit at 9 kHz is from the spectrum analyzer.

LTE Band 14	
Channel Bandwidth: 5 MHz	
Channel 23355	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 1.559 GHz
	
Frequency Range: 1.559 GHz ~ 1.61 GHz	Frequency Range: 1.61 GHz ~ 8 GHz
	

Note: The signal over the limit at 9 kHz is from the spectrum analyzer.

LTE Band 14	
Channel Bandwidth: 10 MHz	
Channel 23330	
Frequency Range: 9 kHz ~ 1 GHz	Frequency Range: 1 GHz ~ 1.559 GHz
	
Frequency Range: 1.559 GHz ~ 1.61 GHz	Frequency Range: 1.61 GHz ~ 8 GHz
	

Note: The signal over the limit at 9 kHz is from the spectrum analyzer.

4.8 Radiated Emission Measurement

4.8.1 Limits of Radiated Emission Measurement

(1) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least 43 +10 log (P) dB. The limit of emission is equal to -13 dBm.

(2) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

4.8.2 Test Procedure

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.

b. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

c. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dB.

Note:

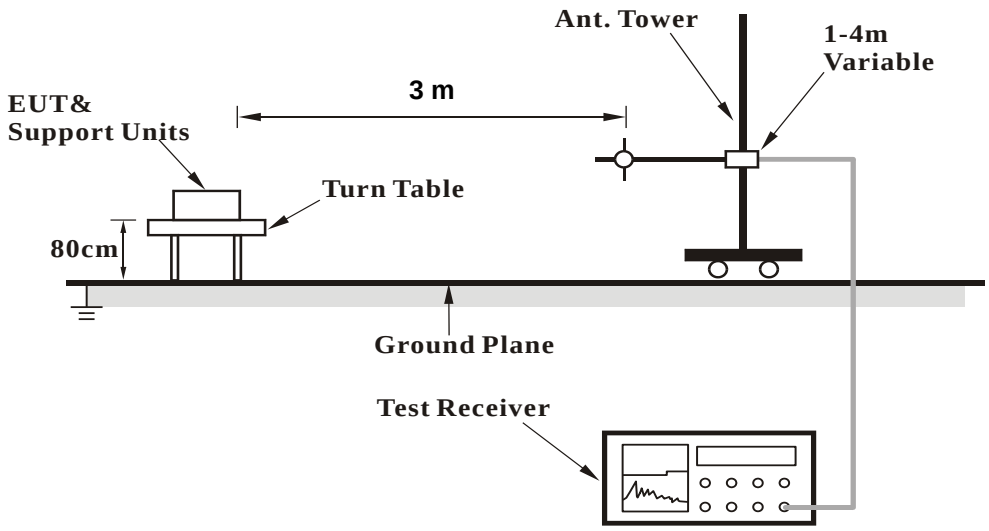
1. The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.
2. The emission levels were against the limit of frequency range 9 kHz ~ 30 MHz:
   The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

4.8.3 Deviation from Test Standard

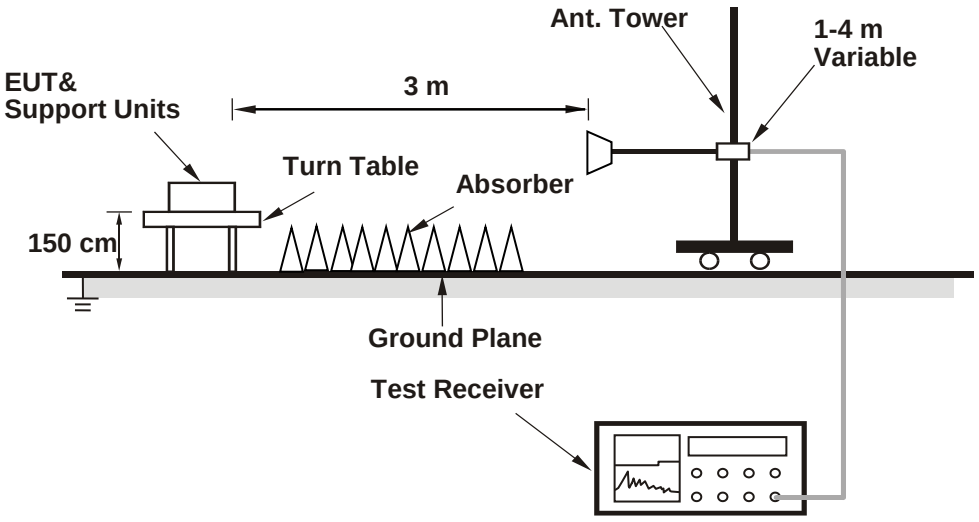
No deviation.

4.8.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

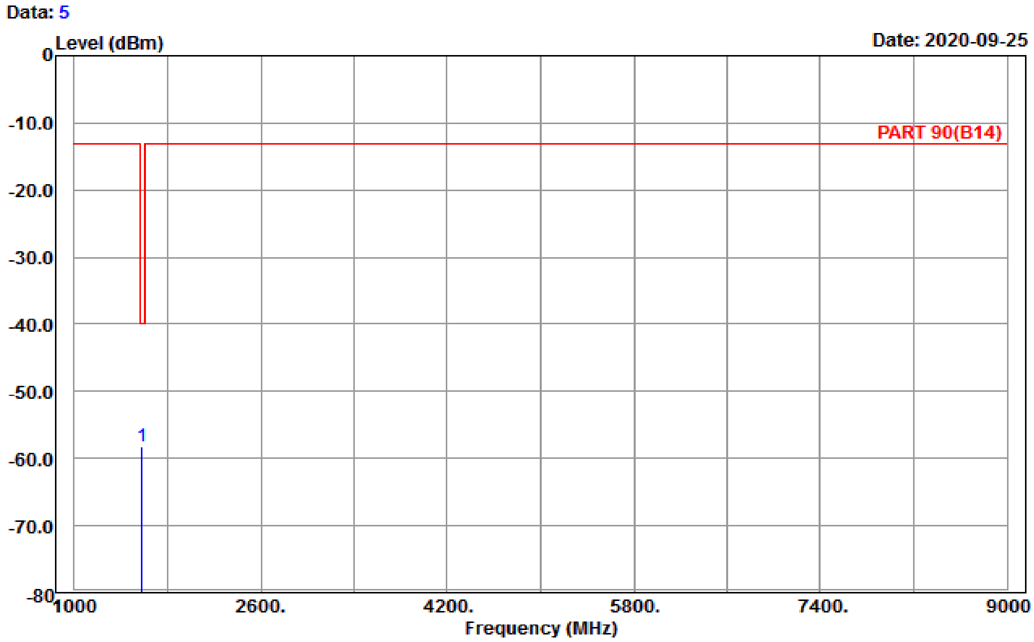
4.8.5 Test Results

LTE Band 14

Channel Bandwidth: 5 MHz / QPSK

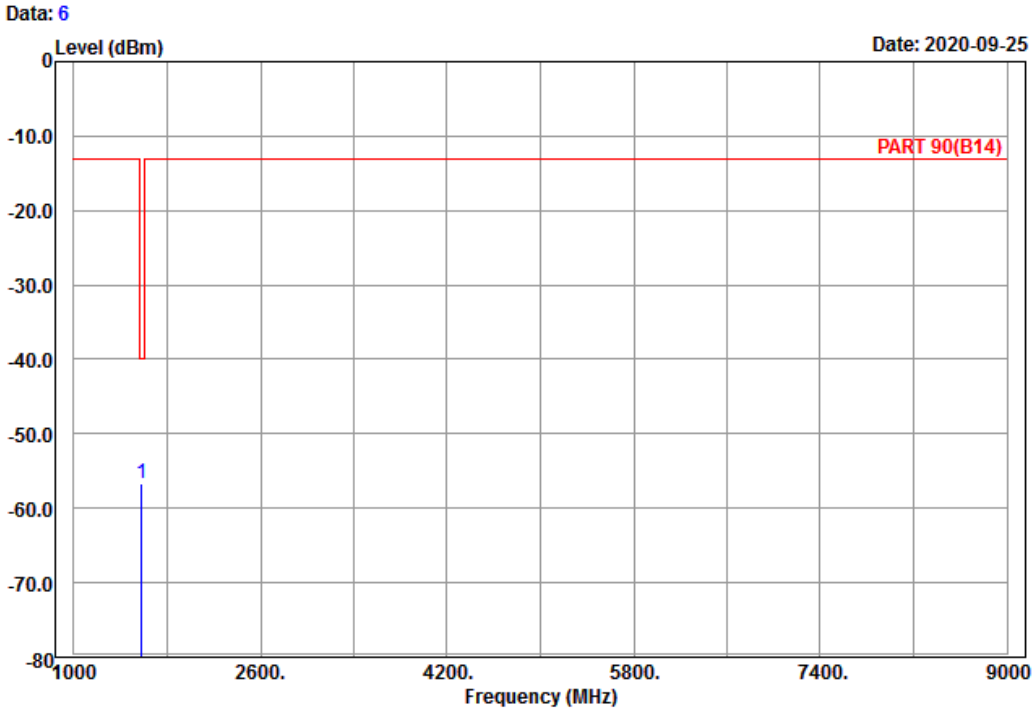
Low Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 90(B14) Horizontal
Remark : LTE_Band 14_Link_L-Ch
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	1581.00	-58.13	-65.17	7.04	-40.00	-18.13	Peak

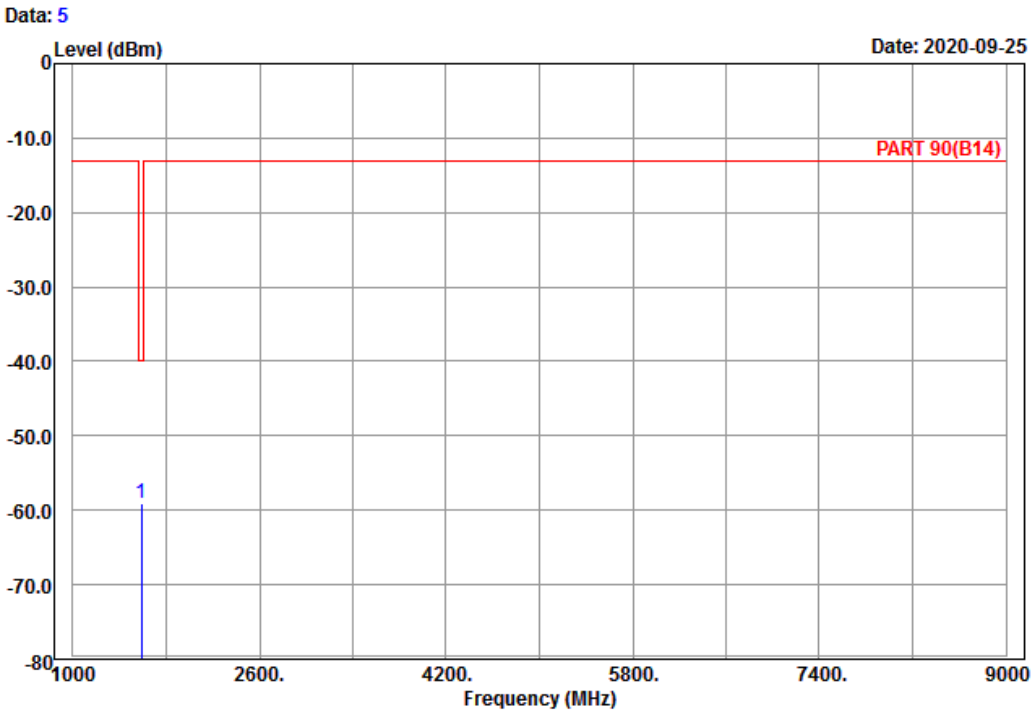


Site : 966 chamber 1
Condition: PART 90(B14) Vertical
Remark : LTE_Band 14_Link_L-Ch
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	1581.00	-56.75	-63.79	7.04	-40.00	-16.75	Peak

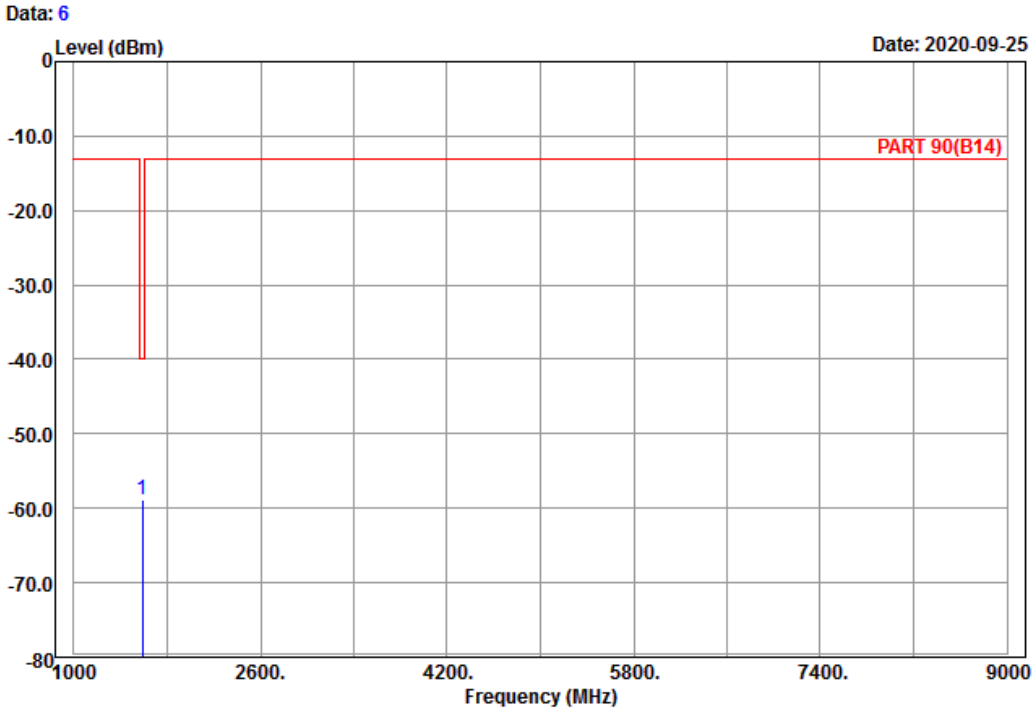
Middle Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 90(B14) Horizontal
Remark : LTE_Band 14_Link_M-Ch
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	1586.00	-58.97	-66.18	7.21	-40.00	-18.97	Peak

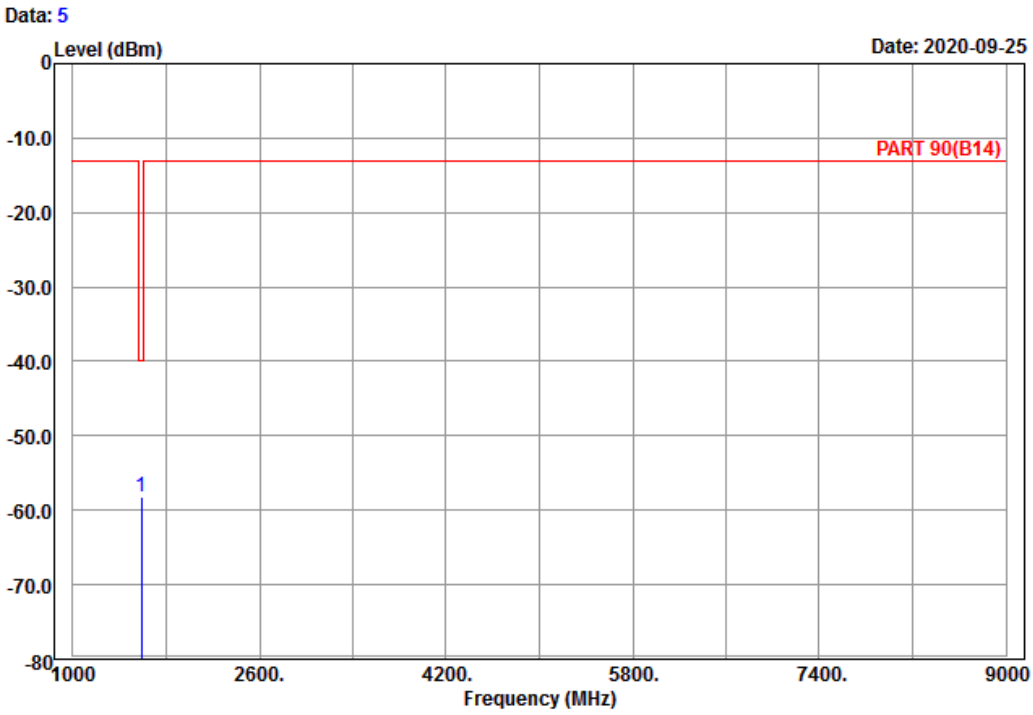


Site : 966 chamber 1
Condition: PART 90(B14) Vertical
Remark : LTE_Band 14_Link_M-Ch
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	1586.00	-58.83	-66.04	7.21	-40.00	-18.83	Peak

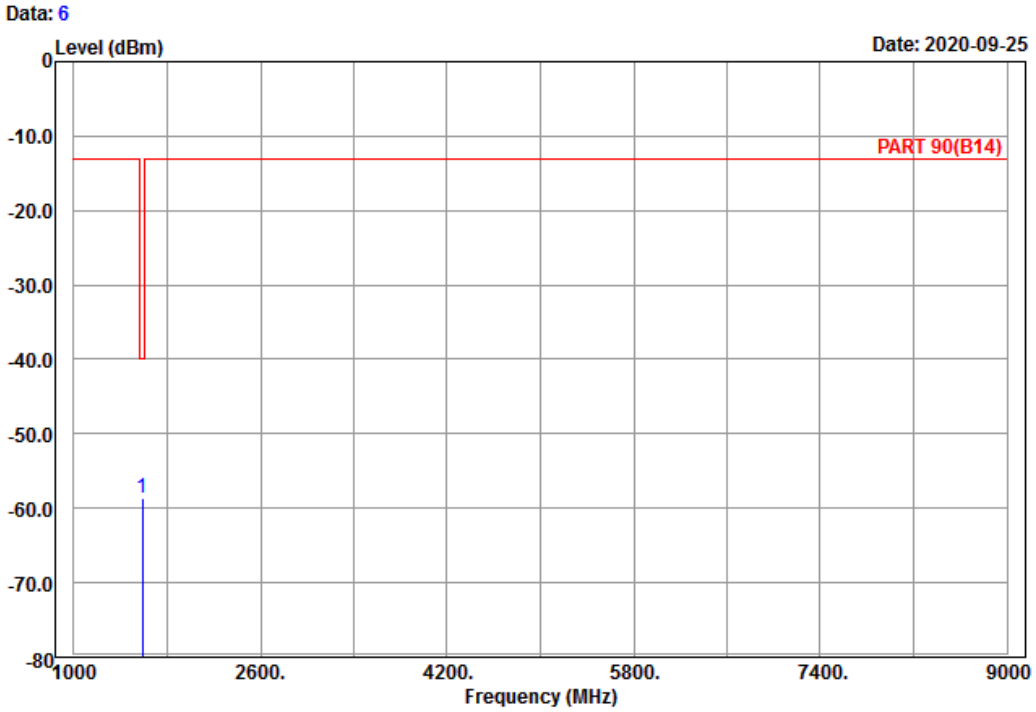
High Channel

Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch



Site : 966 chamber 1
Condition: PART 90(B14) Horizontal
Remark : LTE_Band 14_Link_H-Ch
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	1591.00	-58.17	-65.38	7.21	-40.00	-18.17	Peak



Site : 966 chamber 1
Condition: PART 90(B14) Vertical
Remark : LTE_Band 14_Link_H-Ch
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1 pp	1591.00	-58.66	-65.87	7.21	-40.00	-18.66	Peak

Channel Bandwidth: 10 MHz / QPSK
Middle Channel

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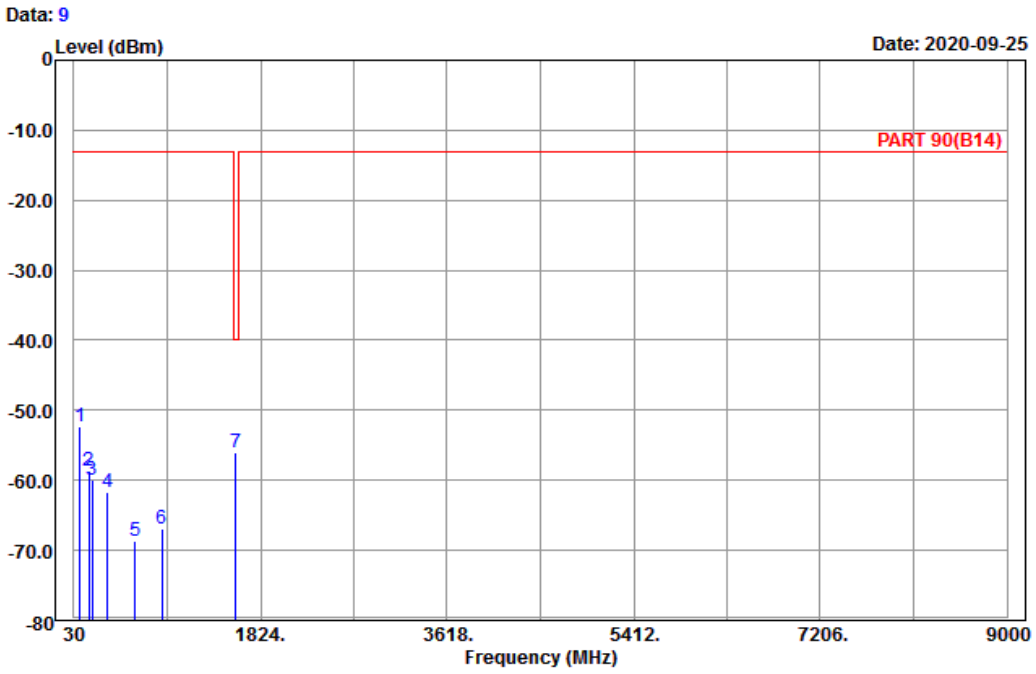
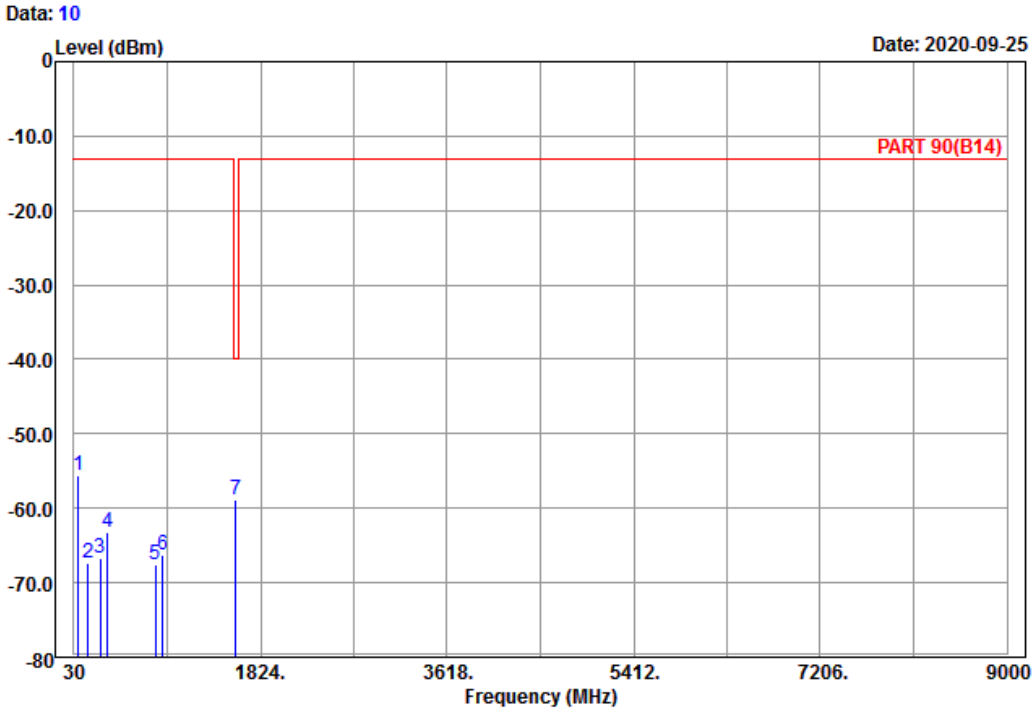


Site : 966 chamber 1
Condition: PART 90(B14) Horizontal
Remark : LTE_Band 14_Link_M-Ch
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	90.21	-52.24	-41.57	-10.67	-13.00	-39.24	Peak
2	170.94	-58.65	-52.05	-6.60	-13.00	-45.65	Peak
3	206.31	-59.86	-53.77	-6.09	-13.00	-46.86	Peak
4	351.80	-61.60	-56.33	-5.27	-13.00	-48.60	Peak
5	619.20	-68.67	-68.89	0.22	-13.00	-55.67	Peak
6	874.70	-67.02	-69.19	2.17	-13.00	-54.02	Peak
7 pp	1586.00	-56.03	-63.24	7.21	-40.00	-16.03	Peak



Site : 966 chamber 1
Condition: PART 90(B14) Vertical
Remark : LTE_Band 14_Link_M-Ch
Tested by: Karl Lee

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBm	dBm	dB	dBm	dB	
1	76.44	-55.67	-43.57	-12.10	-13.00	-42.67	Peak
2	170.13	-67.33	-60.62	-6.71	-13.00	-54.33	Peak
3	284.34	-66.79	-60.97	-5.82	-13.00	-53.79	Peak
4	357.40	-63.18	-58.22	-4.96	-13.00	-50.18	Peak
5	812.40	-67.59	-69.46	1.87	-13.00	-54.59	Peak
6	883.80	-66.30	-68.72	2.42	-13.00	-53.30	Peak
7 pp	1586.00	-58.91	-66.12	7.21	-40.00	-18.91	Peak

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

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